

CLAIMS

What is claimed is:

Sub 1 A2

1. A method comprising:
 - storing data in a first memory, the first memory being a non-volatile storage medium in a cache; and
 - pinning a portion of the data stored in the first memory.
2. The method of claim 1, wherein storing the data comprises storing the data in a mass storage cache.
3. The method of claim 1, wherein pinning of data comprises pinning the portion of data necessary for a system initialization.
4. The method of claim 1, wherein the pinning of data comprises:
 - storing metadata corresponding to the data stored in the first memory; and
 - setting a state in the metadata to indicate that a corresponding line of data is pinned.
5. The method of claim 4, wherein storing the metadata comprises storing the metadata in a second memory.
6. The method of claim 4, wherein storing the metadata comprises storing the metadata in a volatile storage media.
7. A metadata stored in a memory comprising:

2 a first state to indicate a least recently used information of a corresponding
3 line of data in a non-volatile memory; and

4 a second state to indicate whether a corresponding line of data in the non-
5 volatile memory is pinned.

1 8. The metadata of claim 7, further comprising:

2 a third state to indicate whether a corresponding line of data in the non-
3 volatile memory was present before a system initialization.

1 9. The metadata of claim 7, wherein the metadata is stored in a volatile
2 storage media.

1 10. A system comprising:

2 a cache including a first storage media to store cache data, the first storage
3 media being a non-volatile storage media; and

4 a second storage media to store metadata for the cache data stored in the
5 first storage media, the metadata including a state to indicate whether a
6 corresponding line of data is pinned.

1 11. The system of claim 10, wherein the cache is a mass storage cache.

1 12. The system of claim 10, wherein the second storage media is a
2 volatile storage media.

1 13. The system of claim 10, wherein the second storage media is
2 included in the cache.

1 14. The system of claim 10, wherein the cache is implemented as an add-
2 in card.

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1 15. A method comprising:
2 accessing a first memory during a system initialization, the first memory
3 being a cache; and
4 pinning data accessed during the system initialization in the first memory.

1 16. The method of claim 15, wherein the cache is a mass storage cache.

1 17. The method of claim 15, further comprising:
2 limiting the pinning of data during the system initialization.

1 18. The method of claim 15, wherein the pinning of data during the
2 system initialization comprises:
3 storing metadata for the data stored in the first memory, the metadata
4 including a first state to indicate whether a corresponding line of data is pinned; and
5 setting a first state corresponding to the accessed data to indicate that the
6 accessed data is pinned.

1 19. The method of claim 18, wherein the pinning of data further
2 comprises:
3 setting a timer upon the system initialization; and
4 setting a first state corresponding to the accessed data until the timer
5 expires.

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1 20. The method of claim 18, wherein the pinning of data further
2 comprises:

3 setting a maximum amount of data to pin; and
4 setting a first state corresponding to the accessed data until the maximum
5 amount is exceeded.

1 21. The method of claim 18, wherein the metadata further includes a
2 second state; and wherein the pinning of data further comprises:

3 setting a second state for data that was present before system initialization,
4 the setting of the second state to indicate that a corresponding data was present
5 before the system initialization;

6 setting a timer upon the system initialization;

7 setting a maximum amount of data to pin;

8 setting a first state corresponding to the accessed data if the maximum
9 amount is not exceeded and if the timer has not expired; and otherwise

10 clearing a first state corresponding to a pinned data and setting a first state
11 corresponding to the accessed data if the second state corresponding to the pinned
12 data is not set and the pinned data corresponding to the accessed data is set, and
13 if the timer has not expired.

1 22. The method of claim 21, wherein the metadata further includes a third
2 state to indicate the age of a corresponding line of data and the clearing of a first
3 state comprises:



23. A system comprising:

4 a second storage media to store metadata for data accessed during the
5 system initialization, the metadata including a first state; and

Figure 1 consists of 12 histograms arranged in a single row. Each histogram represents the frequency distribution of the number of non-zero elements in the vector x for a specific value of n . The x-axis for all histograms is 'Number of non-zero elements in x ' with major ticks at 0, 20, 40, 60, 80, 100, and 120. The y-axis is 'Frequency' with major ticks at 0, 20, 40, 60, 80, and 100. The histograms are labeled with n values: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, and 120. As n increases, the distribution of non-zero elements shifts to the right, indicating that more elements in the vector x are non-zero for larger n .

1 24. The system of claim 23, wherein the metadata further includes a
2 second state; and wherein the memory control hub causes the second state to be
3 set for data present before the system initialization, the setting of the second state
4 to indicate that a corresponding line of data was present before the system
5 initialization.

1 25. The system of claim 23, wherein the cache is a mass storage cache.

1 26. The system of claim 23, wherein the memory control hub limits the
2 amount of data pinned.

1 27. The system of claim 23, wherein the second storage media is a
2 volatile storage media.

1 28. The system of claim 23, wherein the second storage media is
2 included in the cache.

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2 29. The system of claim 23, wherein the cache is implemented as an add-
in card.

1 30. A program loaded into a computer readable media comprising:
2 a first group of computer instructions to access data in a non-volatile cache;
3 a second group of computer instructions to pin data accessed in the non-
4 volatile cache.

1 31. The program of claim 30, wherein the second group of computer
2 instructions includes computer instructions to pin data accessed during a system
3 initialization.

1 32. The program of claim 31, wherein the second group of computer
2 instructions further includes computer instructions to limit the amount of data
3 pinned.

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